

Rainfall Manipulation Plots



OVERVIEW OF NIGEC:

NATIONAL INSTITUTES FOR
GLOBAL ENVIRONMENTAL
CHANGE: <http://nigec.ucdavis.edu>



OPEN TOP CHAMBERS

Jeff Gaffney

WHAT IS NIGEC?

The National Institute for Global Environmental Change is a funded activity of the U.S. Department of Energy. NIGEC focuses its attention at a regional level by dividing the U.S. into six separate regions in order to take into account geographical and geological diversity when researching the consequences of environmental change for the United States. Since the Institute's inception in 1990, its mission has been to assist the nation in its response to human-induced influence on the environment by pursuing excellent research in the field of global climate change.

The U.S. Congress established the National Institute for Global Environmental Change in the Energy and Water Development Appropriations Act of 1990. The University of California operates the Institute for the DOE under a cooperative agreement.

Although NIGEC studies the effects of global environmental change, its focus remains national. To this end, the institute divides the U.S. into six separate regions in order to study environmental change on different geographical and geological systems. These six regions are: Great Plains, Midwest, Northeast, Southcentral, Southeast, and West. These regions represent all 50 states in addition to Puerto Rico and the Virgin Islands.

Each region has a "host institution" - a prominent university that appoints a Regional Director who acts in an administrative capacity. Regional centers develop their own research programs by soliciting proposals from scholars around the nation. These programs must focus on areas important to global environmental change and meet DOE research priorities. Centers issue a joint annual Request for Proposals (RFP), but select only the most excellent for funding.

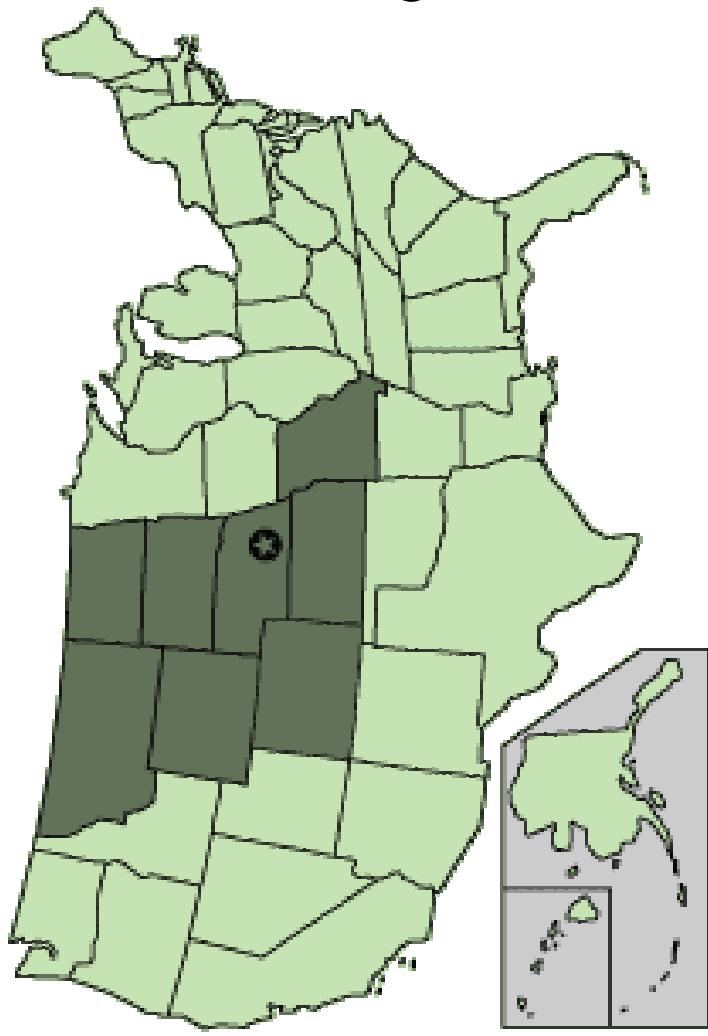
NIGEC GOALS:

- Improving scientific understanding of the mechanisms of global environmental and climate change;
- Reducing uncertainties surrounding key scientific environmental and climate change issues;
- Creating innovative experimental or observation programs to enhance the understanding of regional scale, or ecosystem scale, processes contributing to global change;
- Improving decision-making tools that are appropriate for the global environmental and climate change issues;
- Building education and training opportunities and development of new curriculum materials to increase the flow of talented young people into global environmental change research areas;
- Focusing contributions to the public education on the subject of global climate change.

Congressionally Developed Objectives

- The provision of information to the Department of Energy on energy-related technical data and finite models for the U.S. component of the international discussions on global climate change,
- The development of finite models that can be used to enable public officials to assess energy-related environmental risks,
- Creating innovative experimental or observation programs to enhance the understanding of regional scale, or ecosystem scale, processes contributing to global change;
- The preparation and conduct of public education programs on global warming and other energy-related environmental risks,
- The provision of training opportunities for graduate students and young scientists in environmental and related studies.

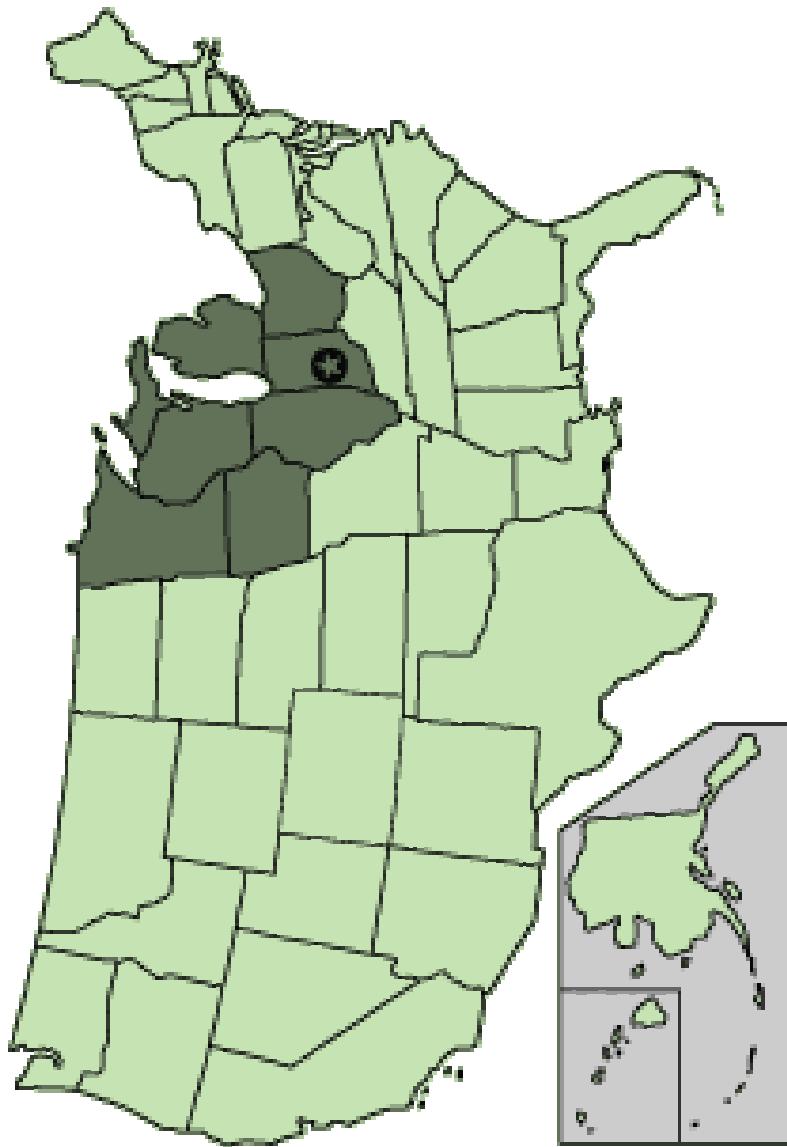
REGIONAL CENTERS



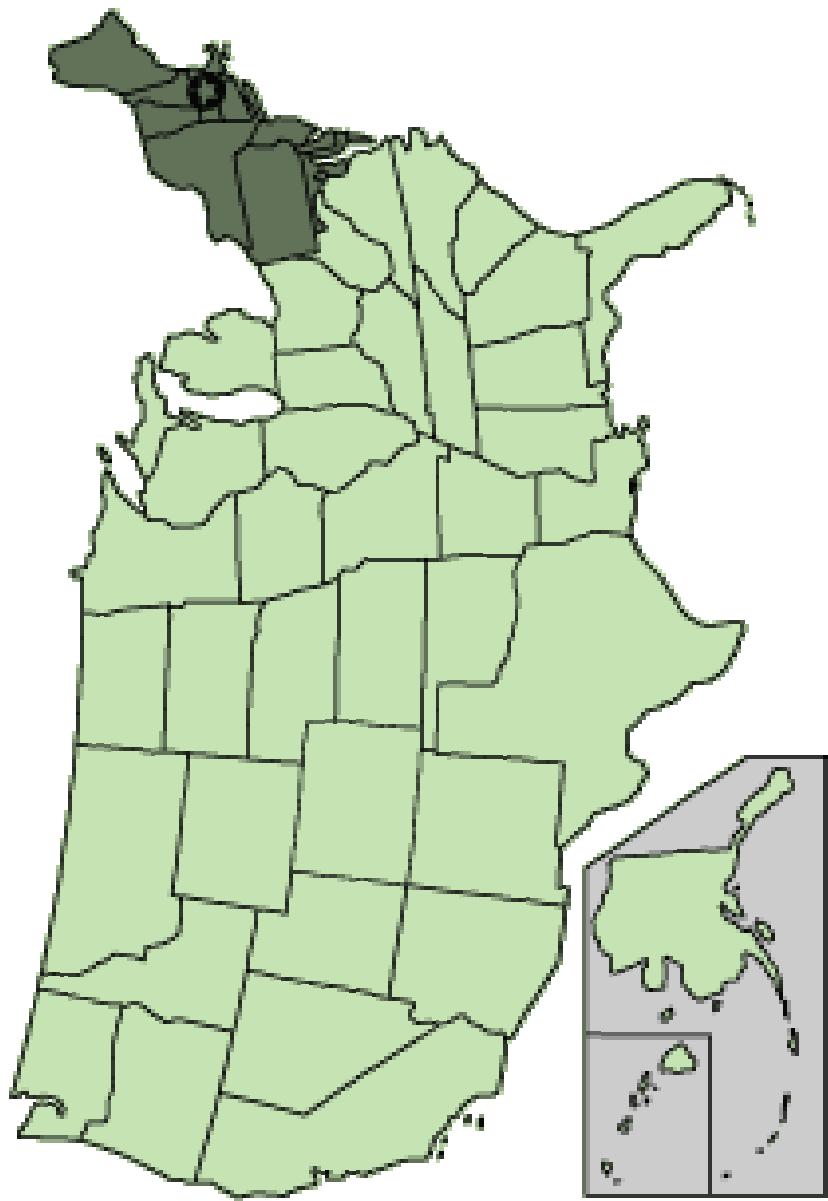
GREAT PLAINS

UNIVERSITY OF NEBRASKA, LINCOLN

MIDWESTERN

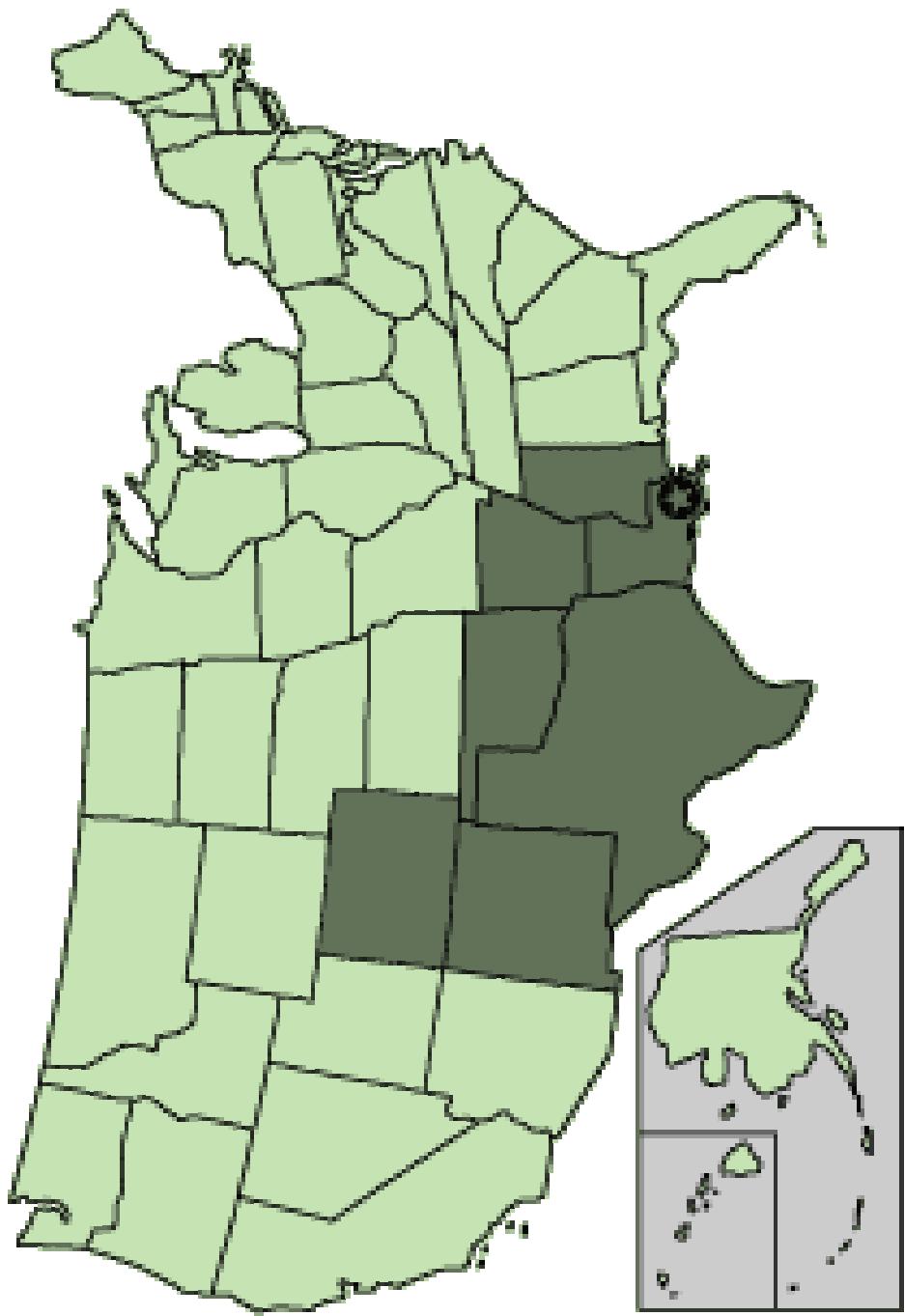


INDIANA UNIVERSITY, BLOOMINGTON

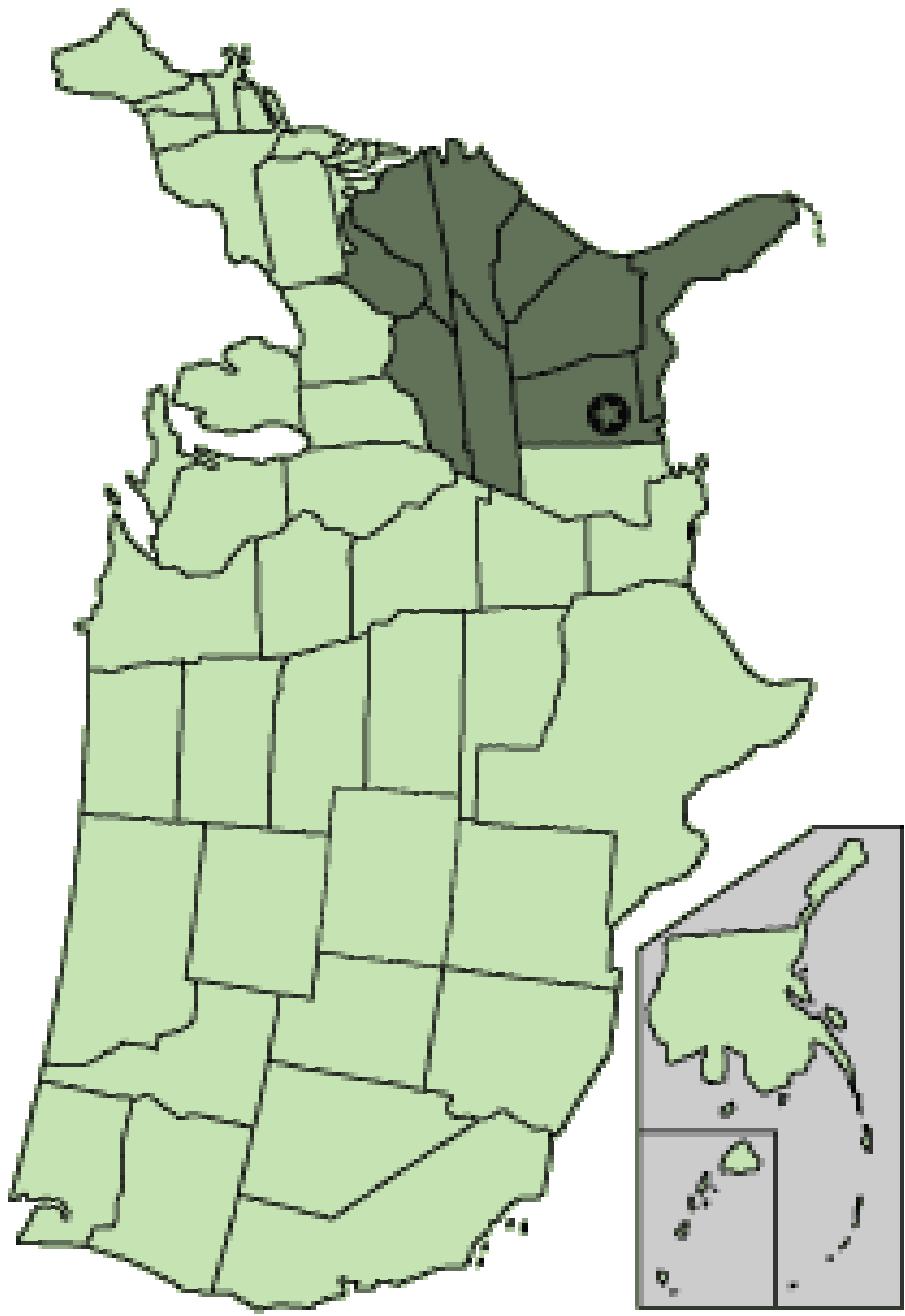


NORTHEAST

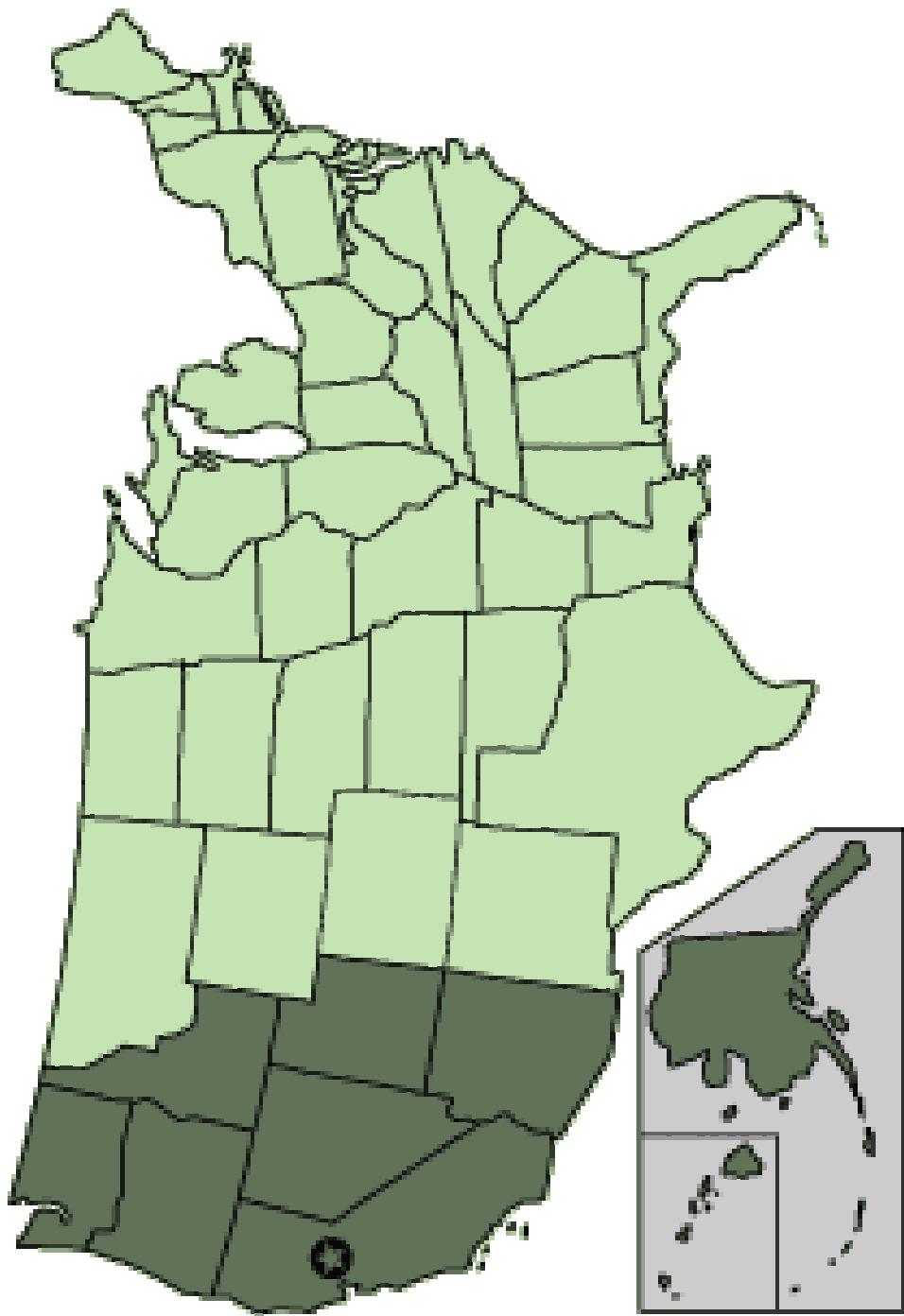
HARVARD UNIVERSITY



SOUTHCENTRAL
TULANE UNIVERSITY



SOUTHEAST
UNIVERSITY OF ALABAMA



WESTGEC

UNIVERSITY OF CALIFORNIA, DAVIS

ALSO SERVES AS NATIONAL CENTER FOR
NIGEC

NIGEC INITIATIVES

AMERIFLUX

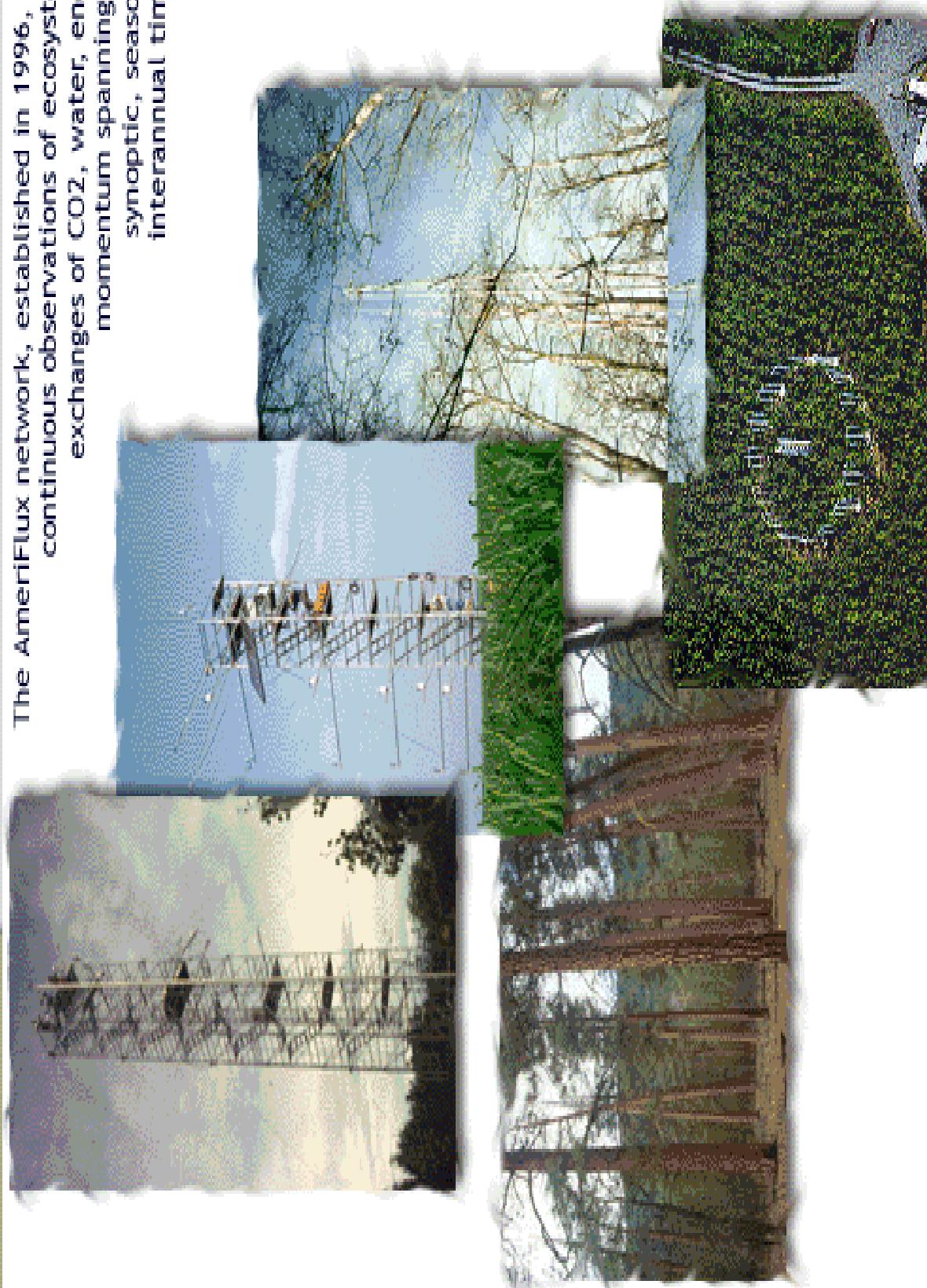
**The Ecological Effects of Environmental Change
(EEECC)**

**Northeast Regional Center of NIGEC Summer
Undergraduate Research Fellowships in the Area
of Global Environmental Change**

AmeriFlux



The AmeriFlux network, established in 1996, provides continuous observations of ecosystem level exchanges of CO₂, water, energy and momentum spanning diurnal, synoptic, seasonal, and interannual time scales.



AmeriFlux Objectives

- establish an infrastructure for guiding, collecting, synthesizing, and disseminating long-term measurements of CO₂, water, and energy exchange from a variety of ecosystems
- collect critical new information to help define the current global CO₂ budget
- enable improved predictions of future concentrations of atmospheric CO₂
- enhance understanding of carbon fluxes, Net Ecosystem Production (NEP), and carbon sequestration in the terrestrial biosphere



MEASUREMENTS AT THE SITES ARE VERY COMPLETE

GAS FLUX – CO₂ AND WATER VAPOR

RADIATION MEASUREMENTS – TOTAL –
PHOTSYNTHETIC

ALBEDO

METEOROLOGICAL MEASUREMENTS

TEMPERATURE – WIND SPEED AND DIRECTION\\

PRECIPITATION, ETC.

ECOLOGICAL MEASUREMENTS – STEM FLOW, ROOT
GROWTH, ETC.

FOR MORE ON AMERIFLUX SEE:

<http://public.ornl.gov/ameriflux/>

The Ecological Effects of Climate Change

- How will ecosystems respond to simultaneous changes in the mean and extremes of climate variables (including temperature and precipitation) in combination with increasing concentrations of atmospheric carbon dioxide and other trace gases such as ozone? How will these responses be affected by other projected and/or ongoing environmental changes (e.g. changing land use)?
- How well do existing process models simulate observed responses of ecosystems to variation and changes in the current climate system and to past changes in climate?
- What is the capacity of ecosystems to adapt to environmental changes and are there thresholds of climate change, with respect to either magnitude or rate of change, above which ecosystems are unable to adapt, with the result that irreversible impacts on ecosystem structure and function occur?
- How will the quantitative links between cycles of carbon, water, energy and nutrients be affected by changes in multiple environmental factors?
- What will be the quantitative effects of multiple environmental changes on relationships between plants and pests (e.g. insects and disease) and between higher animals and parasites?

**NORTHEAST REGIONAL CENTER OF THE
NATIONAL INSTITUTE FOR GLOBAL ENVIRONMENTAL
CHANGE**

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**SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS
IN THE AREA OF GLOBAL ENVIRONMENTAL CHANGE**

RECENT CHANGES IN NIGEC

Funding by the DOE of the Cooperative Agreement with the UC to manage NIGEC will be discontinued in FY 2005 (the FY 2005 funding period is expected to end August 31, 2006). In FY 2006, NIGEC will be renamed the DOE National Institute for Climatic Change Research (NICCCR) and the DOE will manage NICCCR from DOE headquarters. At the same time, the number of Regional Centers will be reduced from six to four. These actions will reduce administrative costs, and those savings will be used to support additional research on a competitive basis.

National Institute for Climatic Change Research

The reconfigured institute will include four Regional Centers hosted by four universities (i.e., the host universities). Each Regional Center will have a Principal Investigator, who will be a member of the faculty of the host university. The host universities for each Regional Center will be located within the respective NICCR region.

Groupings of the 50 states into the four NICCR regions is as follows. (1) Western Region: Alaska, Hawaii, Washington, Oregon, California, Idaho, Nevada, Arizona, Utah, Montana, Wyoming, Colorado, and New Mexico. (2) Midwestern Region: North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Ohio, and Michigan. (3) Southeastern Region: Texas, Louisiana, Arkansas, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, Tennessee, and Kentucky. (4) Northeastern Region: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, the District of Columbia, and Virginia. The grouping of states in the four regions was established based on a combination of the number of states within each region, the fraction of the population of the United States within each region, and the fraction of the Gross Domestic Product of the United States accounted for by each region.

The NICCR Regional Center Principal Investigators will be eligible to apply for research support by DOE through NICRR, but the screening of preproposals and the peer review of associated formal proposals will be conducted by DOE OBER rather than by the Regional Center.

The NICCR Regional Centers should also foster collaborations between NICCR researchers and the relevant DOE OBER research programs, such as the DOE Program for Ecosystem Research, Atmospheric Science Program, and Terrestrial Carbon Processes program.

In FY 2006, it is expected that three research foci will be the basis of the terms of reference of the NICCR request for proposals. Namely, (1) experimental study of effects of warming, altered precipitation, elevated carbon dioxide concentration, and/or elevated ozone concentration on the structure and functioning of terrestrial ecosystems of regional or national importance to the United States, with a priority given to studies including multiple factors; (2) development and/or evaluation of models appropriate to the prediction of effects of climatic change on regionally important terrestrial ecosystems, and development of methods for upscaling ecosystem model results to address regional-scale ecological issues; and (3) observation and analysis of contemporary exchanges of mass and energy between the atmosphere and regionally important terrestrial ecosystems or landscapes, and the use of those observations and analyses to evaluate global climate and carbon cycle models.

Research directed at climatic change mitigation, such as various carbon sequestration options, will not be funded by NICCR in FY 2006. It is expected that NICCR research foci will change over time in parallel with elements of the research priorities of the DOE climate change research program.

New Centers – 5 years

\$1.93 M per center – < 200k/project

Review after 3 years

25% per institution or Regional Center University